Claims

What is claimed is:

1. An apparatus for use in an image processing system, the apparatus comprising:

a combined display-camera having a plurality of display elements and a plurality of camera elements, arranged substantially in a common plane with the display elements being interspersed with the camera elements, and wherein each of at least a subset of the camera elements has one or more imaging angles associated therewith, the one or more imaging angles being selected to provide a desired imaging operation for the combined display-camera.

2. The apparatus of claim 1 wherein at least a subset of the display elements comprise liquid crystal display elements.

3. The apparatus of claim 1 wherein at least a subset of the camera elements comprise charge-coupled device image sensors.

4. The apparatus of claim 1 wherein at least a subset of the camera elements comprise photosensors.

5. The apparatus of claim 1 wherein a given one of the camera elements comprises at least a portion of a pair of collimated plates, and wherein an imaging angle is selected for the given camera element by establishing a corresponding positioning of holes in the collimated plates.

6. The apparatus of claim 1 wherein the combined display-camera comprises a flat panel display.

7. The apparatus of claim 1 wherein at least a subset of the plurality of display elements and at least a subset of the plurality of camera elements are arranged in an array which includes more display elements than camera elements.

8. The apparatus of claim 1 wherein the one or more imaging angles are selected to provide an imaging operation for the combined display-camera which approximates that of a lens-based single-camera system.

9. The apparatus of claim 1 wherein the one or more imaging angles are selected to provide an imaging operation for the combined display-camera which approximates that of a pin-hole camera system.

10. The apparatus of claim 1 wherein the one or more imaging angles for a given one of the camera elements comprises a set of angles including a horizontal angle $\alpha_x = \tan^{-1}(\frac{x}{d})$ and a vertical angle $\alpha_y = \tan^{-1}(\frac{y}{d})$, where x and y denote the horizontal and vertical distances from the camera element to the optical axis of the combined display-camera, and d is the distance from an image plane of the combined display-camera to a desired virtual focus point of the combined display-camera.

11. The apparatus of claim 1 wherein each of at least a subset of the camera elements has a plurality of image sensors associated therewith, such that different imaging angles can be set for the different image sensors of a given camera element, and different perspectives of a scene can be generated in the image processing system.

12. A method for use in an image processing system, the method comprising the steps of:

providing a combined display-camera having a plurality of display elements and a plurality of camera elements, arranged substantially in a common plane with the display elements being interspersed with the camera elements, and wherein each of at least a subset of the camera elements has one or more imaging angles associated therewith; and

selecting the one or more imaging angles to provide a desired imaging operation for the combined display-camera.

13. An article of manufacture comprising a storage medium for storing one or more programs for use in an image processing system, the image processing system including a combined display-camera having a plurality of display elements and a plurality of camera elements, arranged substantially in a common plane with the display elements being interspersed with the camera elements, and wherein each of at least a subset of the camera elements has one or more imaging angles associated therewith, wherein the one or more programs when executed by a processor implement the step of

selecting the one or more imaging angles to provide a desired imaging operation for the combined display-camera.